AMENDMENTS TO THE CLAIMS

Please cancel claims 1 to 16, without prejudice or disclaimer of subject matter, and add new claims 17 to 33, as shown below. This listing of claims replaces all prior versions, and listings, of claims presented in the application.

Listing Of Claims

1. to 16. (Cancelled)

17. (New) A signal output circuit comprising:

a 180-degree phase shifting circuit for shifting a phase of an input signal by an odd multiple of 180 degrees; and

a first operational amplifier having first and second input terminals and an output terminal, the first and second input terminals having a different polarity,

wherein the input signal is input into the first input terminals,

wherein a 180-degree shifted signal output from the 180-degree phase shifting circuit is input to the second input terminal, and

wherein a difference between the input signal and the 180-degree shifted signal is output from the output terminal.

18. (New) The signal output circuit according to claim 17, wherein the 180-degree phase shifting circuit further comprises:

a second operational amplifier having a non-inverted input terminal, an inverted input terminal, and an output terminal;

first through fourth resistors; and

a first capacitor and a second capacitor,

wherein the input signal is input to the inverted input terminal via the first resistor, the first capacitor, and the third resistor, and input to the inverted input terminal via the first resistor and the second capacitor, and

wherein an output of the output terminal is fed back to the inverted input terminal via the third resistor, and fed back to the inverted input terminal via the first capacitor and the second capacitor, and fed back to a signal input side of the first resistor via the fourth resistor and the second resistor.

19. (New) The signal output circuit according to claim 17, wherein the input signal is a wobble signal for rotation control detected from a recording track of an optical disk.

20. (New) The signal output circuit according to claim 17, further comprising

a phase comparator operable to:

compare a phase of the input signal and a phase of the 180-degree shifted signal; and

output a synchronizing signal for synchronizing the 180-degree shifted signal with the input signal,

wherein the 180-degree phase shifting circuit is controlled in response to the synchronizing signal so as to output the 180-degree shifted signal while synchronizing the 180-degree shifted signal with the input signal.

21. (New) The signal output circuit according to claim 20,

wherein the 180-degree phase shifting circuit further comprises:

a second operational amplifier having a non-inverted input terminal, an inverted input terminal, and an output terminal;

first through fourth resistors; and

first and second capacitors, the capacitances of the first and second capacitors capable of being changed in response to the synchronizing signal,

wherein the input signal is input to the inverted input terminal via the first resistor, the first capacitor, and the third resistor, and input to the inverted input terminal via the first resistor and the second capacitor, and

wherein an output of the output terminal is fed back to the inverted input terminal via the third resistor, fed back to the inverted input terminal via the first capacitor and the second capacitor, and fed back to a signal input side of the first resistor via the fourth resistor and the second resistor.

22. (New) The signal output circuit according to claim 20, wherein the input signal is a wobble signal for rotation control detected from a recording track of an optical disk.

23. (New) The signal output circuit according to claim 17, further comprising:

a voltage controlled oscillator ("VCO") circuit; and

a phase comparator operable to:

compare the input signal and an output of the VCO circuit; and

output a synchronizing signal for synchronizing the 180-degree shifted signal with the input signal,

wherein the 180-degree phase shifting circuit and the VCO circuit are controlled in response to the synchronizing signal so as to output the 180-degree shifted signal while synchronizing the 180-degree shifted signal with the input signal.

24. (New) The signal output circuit according to claim 23,

wherein the 180-degree phase shifting circuit comprises:

a second operational amplifier having a non-inverted input terminal, an inverted input terminal, and an output terminal;

first through fourth resistors; and

first and second capacitors, the capacitances of the first and second capacitors capable of being changed in response to the synchronizing signal,

wherein the input signal is input to the inverted input terminal via the first resistor, the first capacitor, and the third resistor, and input to the inverted input terminal via the first resistor and the second capacitor, and

wherein an output of the output terminal is fed back to the inverted input terminal via the third resistor, and fed back to the inverted input terminal via the first capacitor and the second capacitor, and fed back to a signal input side of the first resistor via the fourth resistor and the second resistor.

25. (New) The signal output circuit according to claim 23, wherein the input signal is a wobble signal for rotation control detected from a recording track of an optical disk.

26. (New) A signal output circuit comprising:

a 360-degree phase shifting circuit for shifting a phase of an input signal by an integral multiple of 360 degrees; and

a first operational amplifier having a first and second input terminals and an output terminal, the first and second input terminals having a same polarity,

wherein the input signal is input to the first input terminal,

wherein a 360-degree shifted signal output from the 360-degree phase shifting circuit is input to the second input terminal, and

wherein a sum of the input signal and the 360-degree shifted signal is output from the output terminal.

27. (New) The signal output circuit according to claim 26,

wherein the 360-degree phase shifting circuit comprises:

a second operational amplifier having a non-inverted input terminal, an inverted input terminal, and an output terminal;

a third operational amplifier having a non-inverted input terminal, an inverted input terminal, and an output terminal;

first through fifth resistors; and

first and second capacitors,

wherein the input signal is input to the inverted input terminal of the second operational amplifier via the first resistor, the first capacitor, and the third resistor, and input to the inverted input terminal of the second operational amplifier via the first resistor and the second capacitor,

wherein an output of the output terminal of the second operational amplifier is fed back to the inverted input terminal of the second operational amplifier via the third resistor, and fed back to the inverted input terminal of the second operational amplifier via the first capacitor and the second capacitor, and fed back to a signal input side of the first resistor via the fourth resistor and the second resistor, and input to the inverted input terminal of the third operational amplifier via the fourth resistor, and

wherein an output of the output terminal of the third operational amplifier is fed back to the inverted input terminal of the third operational amplifier via the fifth resistor.

28. (New) The signal output circuit according to claim 26, wherein the input signal is a wobble signal for rotation control detected from a recording track of an optical disk.

29. (New) A signal output circuit comprising:

a 180-degree phase shifting circuit for shifting a phase of an input signal by an odd multiple of 180 degrees;

a 360-degree phase shifting circuit for shifting a phase of the input signal by an integral multiple of 360 degrees; and

an operational amplifier having first through third input terminals and an output terminal, the first and second input terminals having a same polarity, and the third input terminal having a different polarity than the first and second input terminals,

wherein the input signal is input to the first input terminal,

wherein a 360-degree shifted signal output from the 360-degree phase shifting circuit is input to the second input terminal,

wherein a 180-degree shifted signal output from the 180-degree phase shifting circuit is input to the third input terminal, and

wherein a difference of a sum of the input signal and the 360-degree shifted signal from the 180-degree shifted signal is output from the output terminal.

30. (New) The signal output circuit according to claim 29, wherein the input signal is a wobble signal for rotation control detected from a recording track of an optical disk.

31. (New) A signal output method comprising:

outputting a 180-degree shifted signal from a 180-degree phase shifting circuit, the 180-degree shifted signal being phase-shifted from an input signal by an odd multiple of 180 degrees;

inputting the input signal to a first input terminal of an operational amplifier;

inputting the 180-degree shifted signal to a second input terminal of the operational amplifier, the first and second input terminals having a different polarity; and

outputting a difference between the input signal and the 180-degree shifted signal from an output terminal of the operational amplifier.

32. (New) A signal output method comprising:

outputting a 360-degree shifted signal from a 360-degree phase shifting circuit, the 360-degree shifted signal being phase-shifted from an input signal by an integral multiple of 360 degrees;

inputting the input signal to a first input terminal of an operational amplifier;

inputting the 360-degree shifted signal to a second input terminal of the operational amplifier, the first and second input terminals having a same polarity; and

outputting a sum of the input signal and the 360-degree shifted signal from an output terminal of the operational amplifier.

33. (New) A signal output method comprising:

outputting a 180-degree shifted signal from a 180-degree phase shifting circuit, the 180-degree shifted signal being phase-shifted from an input signal by an odd multiple of 180 degrees;

outputting a 360-degree shifted signal from a 360-degree phase shifting circuit, the 360-degree shifted signal being phase-shifted from the input signal by an integral multiple of 360 degrees;

inputting the input signal to a first input terminal of an operational amplifier;

inputting the 360-degree shifted signal to a second input terminal of the operational amplifier, the first and second input terminals having a same polarity;

inputting the 180-degree shifted signal to a third input terminal of the operational amplifier, the third input having a different polarity than the first and second input terminals; and

outputting a difference of a sum of the input signal and the 360-degree shifted signal from the 180-degree shifted signal, from an output terminal of the operational amplifier.